

EXAMINED BY : <i>Eric Le</i>	EMERGING DISPLAY TECHNOLOGIES CORPORATION	FILE NO . CAS-10312
APPROVED BY: <i>MS Huang</i>		ISSUE : MAR.24,2003
		TOTAL PAGE : 11
		VERSION : 3

CUSTOMER ACCEPTANCE SPECIFICATIONS

MODEL NO. :

2 4 H A 0 (EL TYPES)

FOR MESSRS :

CUSTOMER'S APPROVAL

DATE :

BY :

RECORDS OF REVISION

DOC . FIRST ISSUE

JAN.17,2003

DATE	REVISED PAGE NO.	SUMMARY																																												
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NUMBERING SYSTEM

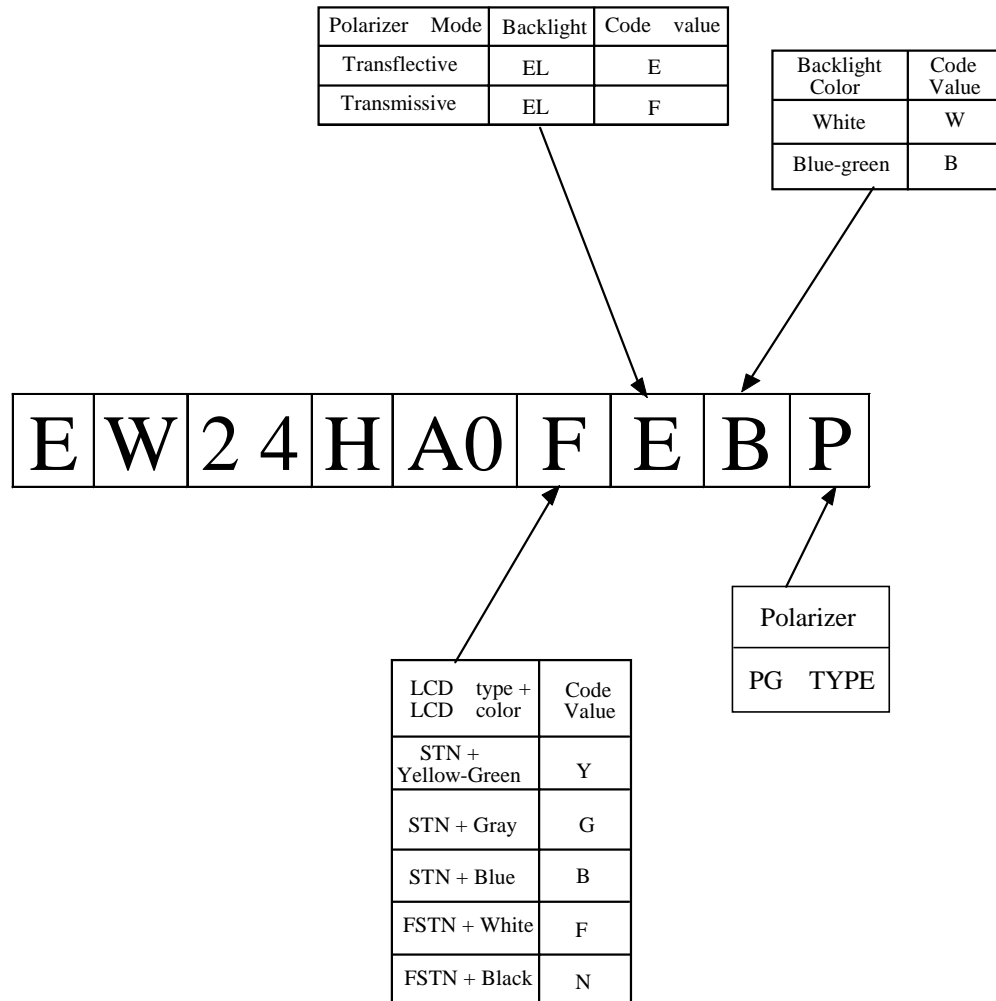


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1. GENERAL SPECIFICATIONS

1.1 GENERAL SPECIFICATIONS

PLEASE REFER TO :

CUSTOMER ACCEPTANCE STANDARD SPECIFICATIONS :

E U - 0 0 2 A

1.2 APPLICATION NOTES FOR CONTROLLER / DRIVER .
SPECIFICATIONS .

PLEASE REFER TO : LCD DRIVER / UC1611

2. MECHANICAL SPECIFICATIONS

- | | | |
|-----------------------|-------|------------------------------|
| (1) NUMBER OF DOTS | ----- | 240W * 160H DOTS |
| (2) MODULE SIZE | ----- | 67W * 52.5H * 6.5D (max.) mm |
| (3) EFFECTIVE AREA | ----- | 62W * 45.7H mm |
| (4) ACTIVE AREA | ----- | 55.19W * 41.59H mm |
| (5) DOT SIZE | ----- | 0.22W * 0.25H mm |
| (6) DOT PITCH | ----- | 0.23W * 0.26H mm |
| (7) LCD TYPE * | | |
| (8) DRIVING METHOD | ----- | 1 / 160 DUTY MULTIPLEX DRIVE |
| (9) VIEWING DIRECTION | ----- | 6 O'CLOCK |
| (10) BACK LIGHT * | | |

* PLEASE REFER TO NUMBERING SYSTEM .

3. ABSOLUTE MAXIMUM RATINGS

3.1 ELECTRICAL ABSOLUTE MAXIMUM RATINGS . (AT Ta = 25 °C)

PARAMETER		SYMBOL	MIN .	MAX .	UNIT	REMARK
POWER SUPPLY FOR LOGIC		VDD – VSS	-0.3	4.0	V	
POWER SUPPLY FOR LCD DRIVING		VLCD	-0.3	18.0	V	
ANY INPUT / OUTPUT		VIN / VOUT	-0.3	VDD+0.3	V	
STATIC ELECTRICITY		—	—	100	V	NOTE (1)
POWER SUPPLY FOR EL BACKLIGHT	VOLTAGE	VEL VDD	—	5	V	

NOTE (1) : TEST METHOD AND CONDITIONS :
AFTER CHARGING UP 200 PF CAPACITOR BY STATED VOLTAGE ,
THE CAPACITOR IS CONNECTED WITH INTERFACE PINS OF THE
MODULE .

3.2 ENVIRONMENTAL ABSOLUTE MAXIMUM RATINGS .

I T E M	OPERATING		STORAGE		REMARK
	MIN .	MAX .	MIN .	MAX .	
AMBIENT TEMPERATURE	-10 °C	60 °C	-20 °C	70 °C	NOTE (2), (3)
HUMIDITY	—	50 % RH	—	50 % RH	WITHOUT CONDENSATION
VIBRATION	—	2.45 m/S ² (0.25 G)	—	11.76 m/S ² (1.2 G)	10~100HZ XYZ DIRECTIONS 1 Hr.EACH
SHOCK	—	29.4 m/S ² (3 G)	—	490 m/S ² (50 G)	10 mSECONDS XYZ DIRECTIONS 1 TIME EACH
CORROSIVE GAS	NOT ACCEPTABLE		NOT ACCEPTABLE		

NOTE (2) : Ta AT -20°C : 240HR MAX .
70°C : 240HR MAX .

NOTE (3) : BACKGROUND COLOR CHANGES SLIGHTLY DEPENDING ON AMBIENT
TEMPERATURE THIS PHENOMENON IS REVERSIBLE .

4. ELECTRICAL CHARACTERISTICS

PARAMETER	SYMBOL	CONDITION	MIN .	TYP .	MAX .	UNIT
POWER SUPPLY VOLTAGE FOR LOGIC	VDD-VSS	—	1.8	3.0	—	V
H LEVEL INPUT VOLTAGE (NOTE1)	VIH	—	0.8*VDD	—	VDD	V
L LEVEL INPUT VOLTAGE (NOTE1)	VIL	—	VSS	—	0.2*VDD	V
H LEVEL OUTPUT VOLTAGE (NOTE2)	VOH	-IOH= -0.5 mA	0.8*VDD	—	VDD	V
L LEVEL OUTPUT VOLTAGE (NOTE2)	VOL	IOL = 0.5 mA	VSS	—	0.2*VDD	V
INPUT LEAKAGE CURRENT	IIL	VIN = VDD	-1.0	—	1.0	μA
OUTPUT LEAKAGE CURRENT	IOZ	OR VSS	-3.0	—	3.0	μA
OPERATION VOLTAGE FOR CONTRAST	VOP ∅=10°,θ=0° DUTY=1/160	Ta = -10°C	14.7	15.7	16.7	V
		Ta = 25°C	14.2	15.2	16.2	
		Ta = 60°C	13.7	14.7	15.7	
POWER SUPPLY CURRENT FOR LCD DRIVE	IDD	VDD = 3.0V	—	2.0	5.0	mA
POWER SUPPLY FOR EL BACKLIGHT	VEL VDD VEL VSS	—	—	3.0	5.0	V

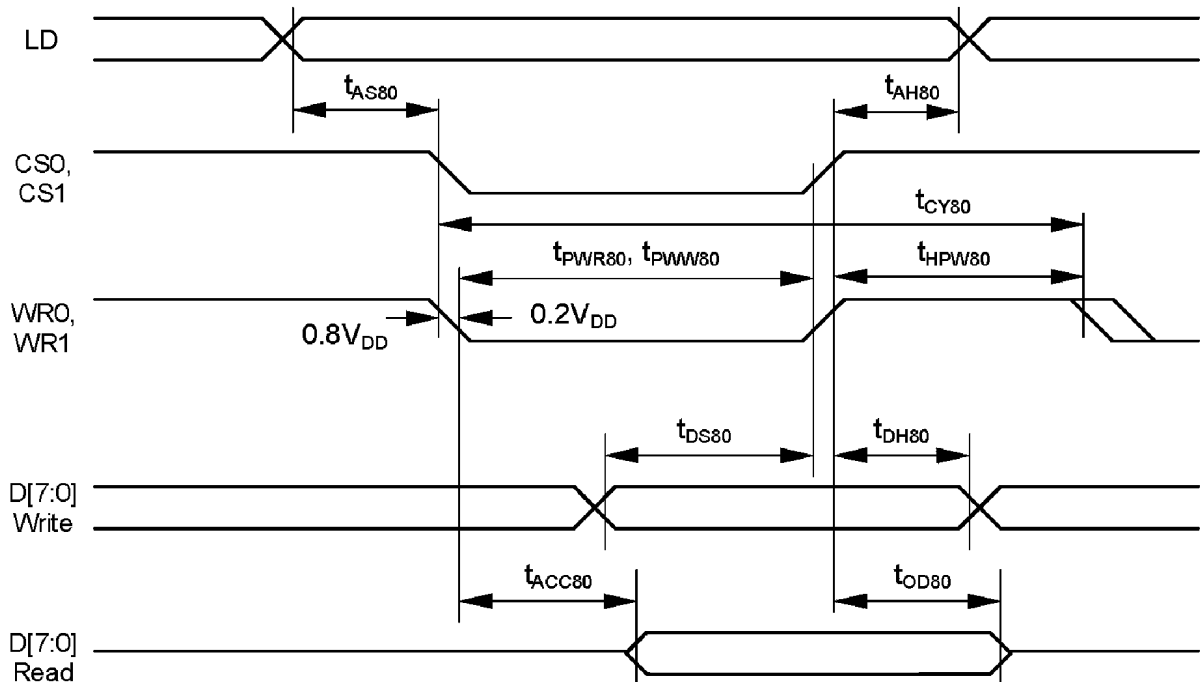
NOTE (1) : PINS : DATA0 ~ DATA7 , RST , $\overline{CS1}$, LD , WR0 , WR1 , BM0 .

NOTE (2) : PINS DATA0 ~ DATA7

5. TIMING CHARACTERISTICS
5.1 INTERFACE TIMING
5.1.1 8080 SERIES MPU

SYMBOL	SIGNAL	DESCRIPTION	CONDITION	MIN.	MAX.	UNITS
t_{AS80}	LD	ADDRESS SETUP TIME		20	—	ns
t_{AH80}		ADDRESS HOLD TIME		40	—	
t_{CY80}		SYSTEM CYCLE TIME		100	—	ns
t_{PWR80}	WR1	PULSE WIDTH (READ)		45	—	ns
t_{PWW80}	WR0	PULSE WIDTH (WRITE)		45	—	ns
t_{HPW80}	WR0 , WR1	HIGH PULSE WIDTH		40	—	ns
t_{ACC80}	D0~D7	DATA SETUP TIME		30	—	ns
		DATA HOLD TIME		10	—	
t_{OD80}		READ ACCESS TIME	$C_L = 100 \text{ pF}$	—	50	ns
		OUTPUT DISABLE TIME		—	50	

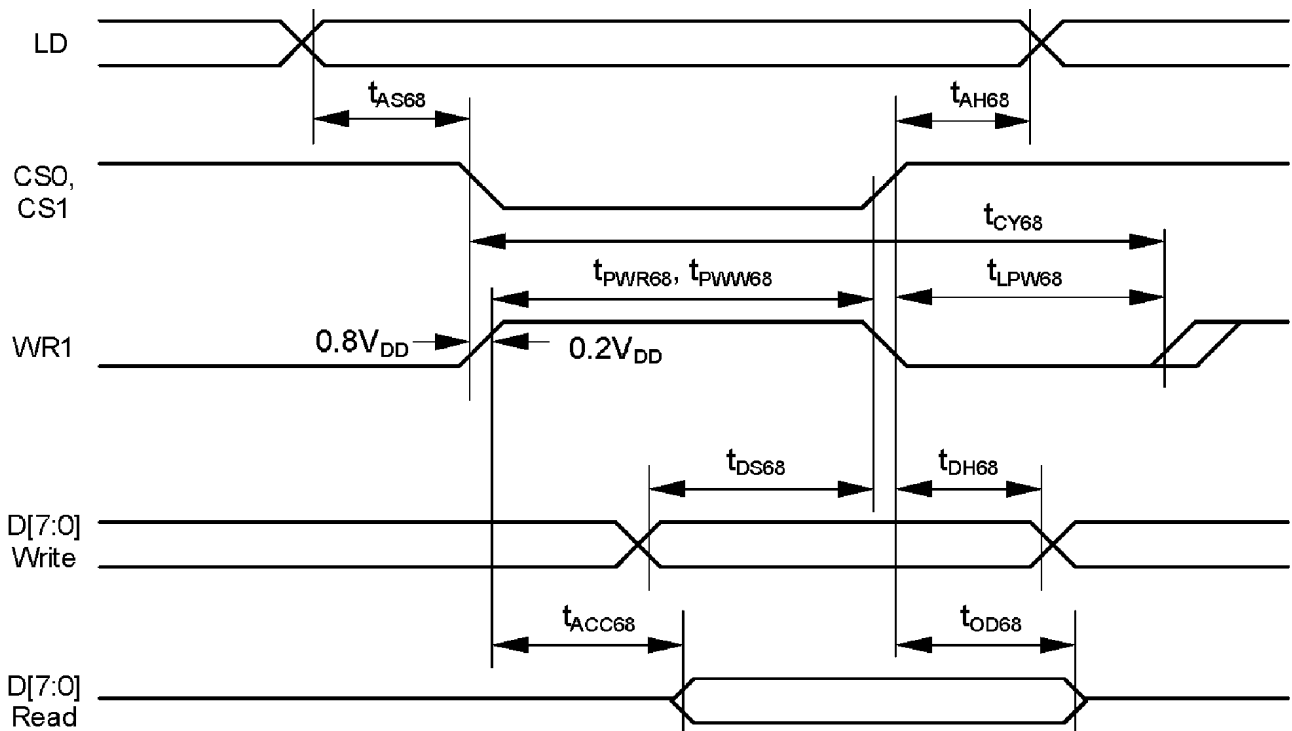
AC CHARACTERISTICS



Parallel Bus Timing Characteristics (for 8080 MCU)

5.1.2 6800 SERIES MPU

Symbol	Signal	Description	Condition	Min.	Max.	Units
t_{AS68}	LD	Address setup time		20	–	ns
t_{AH68}		Address hold time		40	–	ns
T_{CY68}		System cycle time		100	–	ns
t_{PWR68}	WR1	Pulse width (read)		45	–	ns
t_{PWW68}		Pulse width (write)		45	–	ns
t_{LPW68}		Low pulse width		40	–	ns
t_{DS68}	D0~D7	Data setup time		30	–	ns
t_{DH68}		Data hold time		10	–	ns
t_{ACC68}		Read access time	$C_L = 100pF$	–	50	ns
t_{OD68}		Output disable time		10	50	ns



Parallel Bus Timing Characteristics (for 6800 MCU)

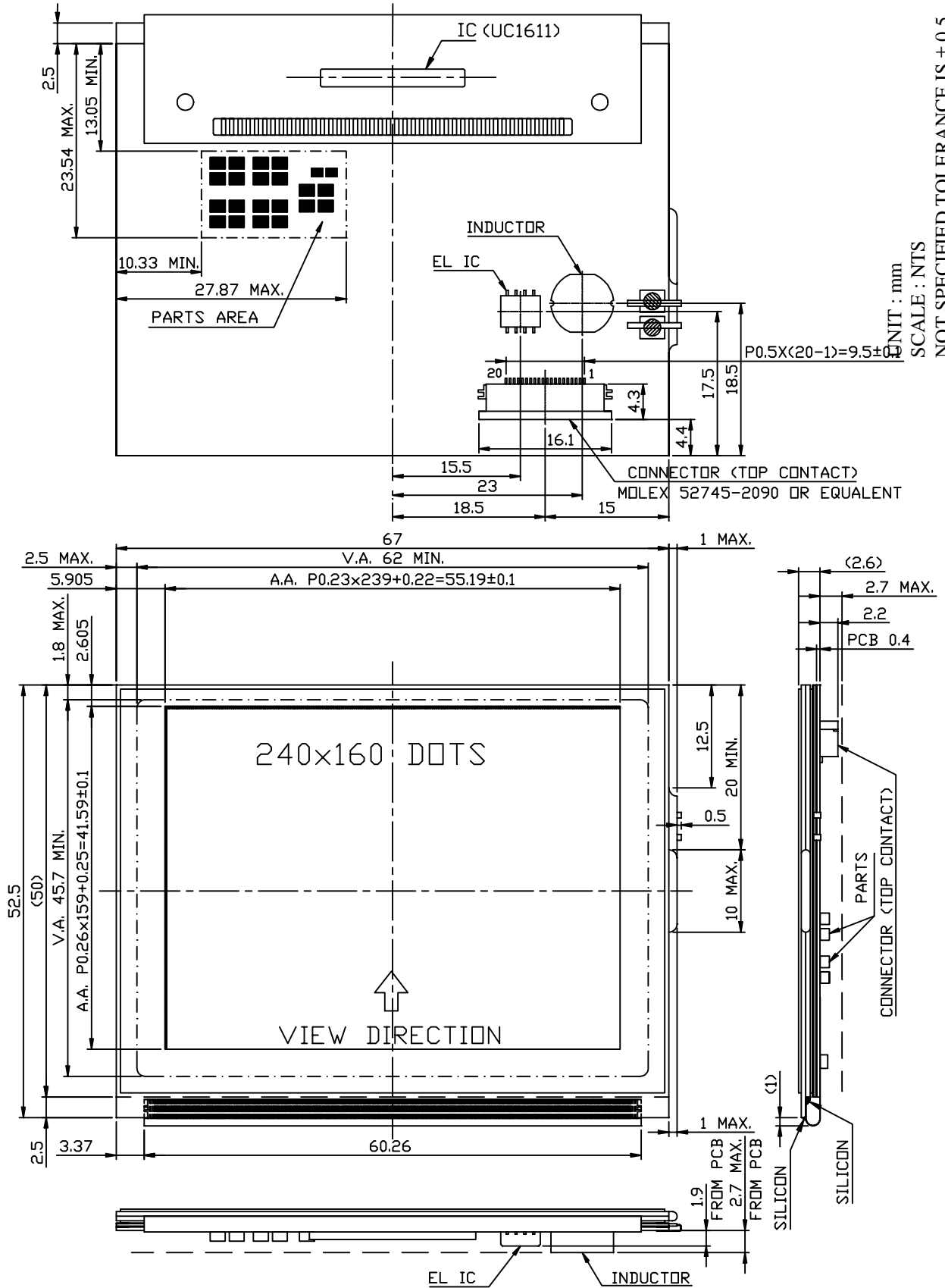
6. OPTICAL CHARACTERISTICS

Ta = 25 °C

I T E M		SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	NOTE
VIEWING AREA	STN	$\varnothing 2 - \varnothing 1$	$K \geq 2.0$	—	(40)	—	deg.	1
	FSTN			(30)	—	—		
CONTRAST	STN	K	$\varnothing = 10^\circ$ $\theta = 0^\circ$	—	2	—	—	1
	FSTN			—	3.5	—		
RESPONSE TIME	tr (rise)		$\varnothing = 10^\circ$ $\theta = 0^\circ$	—	290	400	msec	1
	tf (fall)			—	170	300	msec	1
THE BRIGHTNESS OF MODULE	B	VEL VDD ~ VEL VSS : 3V	$\varnothing = 10^\circ$ $\theta = 0^\circ$	—	(2)	—	cd/m ²	1
		VEL VDD ~ VEL VSS : 5V		—	(3)	—		

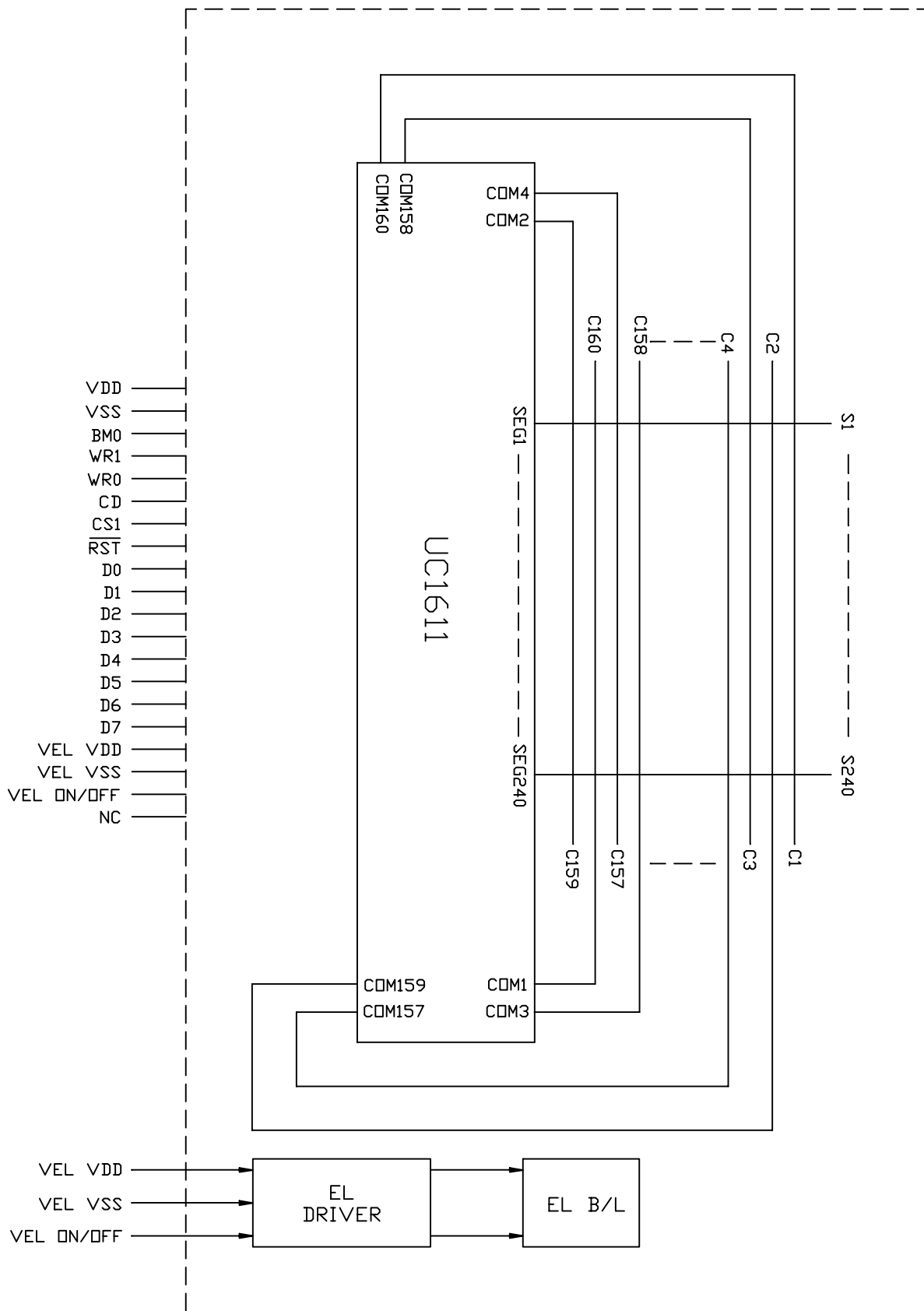
NOTE (1) : PLEASE REFER TO :
CUSTOMER ACCEPTANCE STANDARD SPECIFICATIONS. (EU - 002A)

7. OUTLINE DIMENSION

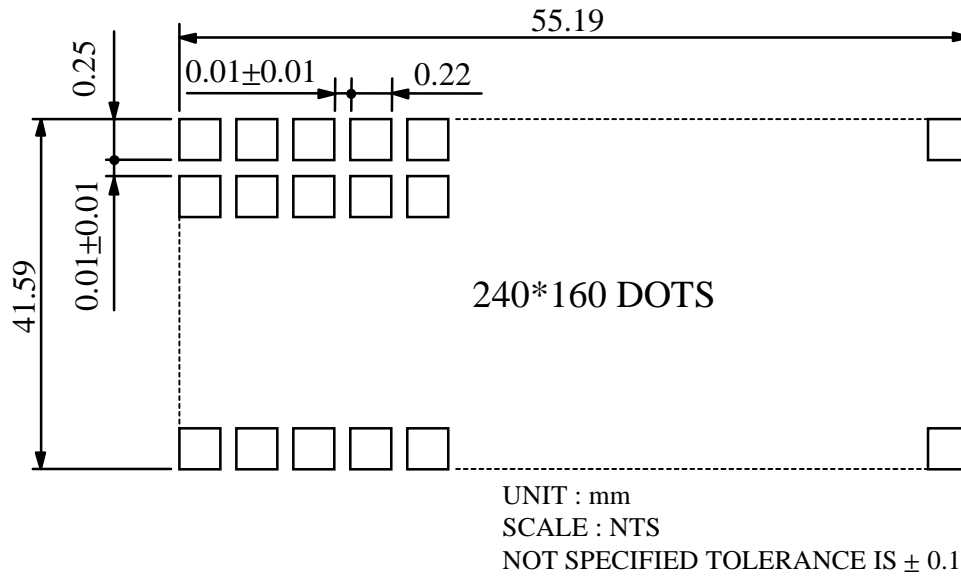


UNIT : mm
SCALE : NTS
NOT SPECIFIED TOLERANCE IS ± 0.5

8. BLOCK DIAGRAM



9. DETAIL DRAWING OF DOT MATRIX



10. INTERFACE SIGNALS

PIN NO.	SYMBOL	FUNCTION									
1	VDD	POWER SUPPLY FOR LOGIC									
2	VSS	GROUND									
3	BM0	“ L “ : 8080 SERIES MPU “ H ” : 6800 SERIES MPU									
4	WR1	<table border="1"> <tr> <td>SERIES MPU TYPE</td> <td>WR0</td> <td>WR1</td> </tr> <tr> <td>8080 SERIES MPU</td> <td>\overline{WR}</td> <td>\overline{RD}</td> </tr> <tr> <td>6800 SERIES MPU</td> <td>R/\overline{W}</td> <td>E</td> </tr> </table>	SERIES MPU TYPE	WR0	WR1	8080 SERIES MPU	\overline{WR}	\overline{RD}	6800 SERIES MPU	R/ \overline{W}	E
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8080 SERIES MPU	\overline{WR}	\overline{RD}									
6800 SERIES MPU	R/ \overline{W}	E									
5	WR0										
6	CD	REGISTER SELECT INPUTS									
7	CS1	CHIP ENBLE INPUTS , ”H” : ENABLE “L” : DISABLE									
8	\overline{RST}	HARDWARE RESET INPUT									
9	D0	DISPLAY DATA									
10	D1										
11	D2										
12	D3										
13	D4										
14	D5										
15	D6										
16	D7										
17	VEL VDD	EL BACKLIGHT DRIVER VOLTAGE (+)									
18	VEL VSS	EL BACKLIGHT DRIVER VOLTAGE (-)									
19	VEL ON/OFF	“H” : EL BACKLIGHT ON “L” : EL BACKLIGHT OFF									
20	NC	NO CONNECTION									

1 1 . POWER SUPPLY

1 1.1 POWER SUPPLY FOR LCM

